GANGRENOUS CHOLECYSTITIS.[1]

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ALTHOUGH many cases of inflammation of the gall-bladder, with secondary peritonitis, have been reported in recent years, I feel that no apology is necessary for putting on record the follow history. Incomplete as the record is in many important details, it furnishes certain features, pathological and clinical, which are interesting and suggestive:

Carl R., aged nineteen, German, a painter by occupation, was admitted to the First Medical Division of Bellevue Hospital on the evening of June 9, 1893, complaining of very severe abdominal pain, which had developed quite suddenly about six hours before. His previous history was negative. He had had acute articular rheumatism some two months before, but never remembered any similar attack of abdominal pain. There was no history of biliary colic.

On admission he was apparently suffering intensely. His abdomen was hard, tense and tender on pressure all over the right side, but especially so at a point corresponding to the situation of the base of the appendix vermiformis. No tumor could be felt in this situation, however, but there was a fullness in the region of the upper segment of the right rectus muscle which extended to the umbilicus. Thinking the case one of acute appendicitis, it was referred to the surgeons.

Seeing the case some two hours later, the previously described conditions were verified. It was not easy at this time to determine clearly the nature of the tumor in the region of the navel, as it simulated closely a spasmodic contraction of the rectus. The whole right side of the abdomen was so tender that a careful examination was impossible, and there was sufficient tympanites present to preclude the possibility of determining accurately the relations of the tumor to the liver. There was at this time no vomiting. The bowels had moved naturally a few hours before, and the patient's general condition seemed fairly good. It was decided, in view of this, to wait until morning for further developments. The temperature at this time was 104° F.; pulse, 126; respiration, 36. A cathartic was ordered, and a small amount of morphia given to keep him comfortable.

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[1] Read before the N. Y. Surgical Society, November 22, 1893.

June 10. The temperature continued elevated throughout the night, ranging between 104.2° and 103.6° F. Vomiting began shortly after midnight, and persisted at frequent intervals thereafter. About noon he was again examined, and the conditions of the previous night found still to persist. The abdomen was now slightly more tympanitic, and generally tender on pressure, though the greatest tenderness was still limited to the right side and to a point corresponding to the base of the appendix. There was marked restriction to the respiratory movements of the right side of the abdomen, and the right thigh was flexed. The expression of the face was anxious. The pulse was rapid and rather feeble, and the vomiting very frequent.

A laparotomy was decided upon, and the patient was transferred to the surgical wards, where the operation was done two hours later. Having carefully washed out the stomach, ether was administered. Under the influence of the anæsthetic, a more careful examination was made. No tumor was felt over the region of the appendix; but the swelling previously described in the upper segment of the right rectus muscle was made out as clearly intra-abdominal, though even at this time its connection with the liver was not determined. The possibility of this tumor being distended gall-bladder was considered, but on account of the patient's youth only as a remotely possible cause of the peritonitis.

An incision about four inches in length was made at the outer border of the right rectus, with its centre near the umbilicus. The appendix was at once sought for and quickly brought into the wound. It was apparently free from disease and normal in appearance, except for the bright red injection of the vessels in its peritoneal coat. On lifting up the cæcum a very small quantity of thin pus came into view, which had evidently run down along the outer layer of the meso-colon. This was quickly taken up with sponges, the rest of the peritoneal cavity having been carefully protected. A further search in this region revealed no other collections of pus, but the intestines were very brightly injected. There were no adhesions. Presenting at the upper angle of the wound was a large tumor of purplish hue, apparently very tense and markedly congested. The incision was prolonged up to the free border of the ribs, and the tumor well exposed. An aspiration needle introduced into it withdrew about a drachm of somewhat thin, sticky fluid, of a yellowish brown color, which had the appearance of bile. The tension having been relieved, calculi could be easily felt through the lower end of the tumor, which was clearly a distended gall-bladder. It was apparently about five inches long, and appeared to be nearly as large around at its neck as at the fundus, which measured about two inches in diameter.

The lower end of the gall-bladder was almost black, its walls exceedingly thin and apparently gangrenous.

The peritoneum covering the entire tumor, together with that of the adjoining intestines, was intensely congested, and in places covered with patches of recent lymph. In some of these patches minute collections of pus were found. These areas having been carefully mopped out with Thiersch's solution, the parietal peritoneum was stitched to the edges of the wound in its upper third. The gall-bladder was then aspirated of its fluid contents, *i.e.*, to the extent of about three drachms, and the tension having been relieved, an attempt was made to stitch it into the wound. This procedure had to be abandoned, as the walls of the fundus were so soft, thin and friable that the sutures immediately tore out.

The lower part of the abdominal incision was then closed, and the upper part stuffed with iodoform gauze, by means of which the gall-bladder was packed securely into the upper part of the wound. The dressings were then applied, as it was not deemed advisable, under the circumstances, to open the gall-bladder at once.

The patient's condition at the close of the operation was bad. He soon rallied, however, from the anæsthetic, but began rapidly to sink. Vomiting continued; the temperature steadily increased until about an hour before his death, when it reached 109°. Death occurred about seven hours after the operation, or about thirty hours from the onset of the attack.

Autopsy.—At the autopsy made the following day, *i.e.*, within twenty-four hours, the following conditions were found:

Lungs.—Congested and œdematous, otherwise normal.

Heart.—Normal in size. Mitral and semilunar valves covered with vegetations and thickened.

Spleen.—Congested, but not especially enlarged, and apparently normal.

Kidneys.—Capsules slightly adherent; markings somewhat indistinct.

Liver.—Normal in size. No abscesses found.

Intestines.—Congested and covered in parts with patches of recent lymph as described. No further pus foci found; no organized adhesions. On opening the duodenum the common bile duct was found to be pervious, and bile could be squeezed through from the gall-bladder.

Gall-bladder.—Greatly enlarged. It measured about five inches in length, and had a nearly uniform diameter of about two inches, though it was slightly larger at the fundus than at the attached portion. It contained about twenty calculi, each as large as a good sized hazelnut, and all facetted. The mucous membrane was deeply bile-stained, and there was a little bile-stained fluid remaining in the sac. One of the largest of the stones rested over the opening of the cystic duct. The walls of the body and neck were enormously thickened, measuring at this time fully three-eighths of an inch. The walls at the fundus, on the other hand, were very thin, soft, friable and gangrenous.

No perforation could be demonstrated by fluid pressure within the bladder.

The interior of the bladder presented a remarkable condition, in that it was almost completely divided by a thick transverse septum, which was found about one and one-half inches from the end of the fundus. This septum was complete, except for a small aperture about one-fourth of an inch in diameter near its centre. The appearance of this curious partition gave rise to the question as to whether it really was a true septum or whether the apparent cavity of the fundus might not be a diverticulum. With a view to determining this point, sections were made through the septum and through the thin walls. Mucous membrane was found absent in both sections, but the muscularis, though thinner than elsewhere, and with its bundles spread apart, was found continuous with that of the gall-bladder. This proved the lower gangrenous end of the tumor to be fundus of the gall-bladder, and not a diverticulum. The walls of the gall-bladder, as shown in both sections, but especially the walls of the middle portion, were found infiltrated with fibrin and pus. The amount of this fibrinous exudate was so great as to easily account for the great thickness of the walls of the gall-bladder, and quite sufficient to determine gangrene of the fundus.

I am indebted to Dr. T. Mitchell Prudden for the careful examination of the sections. A microscopical examination of the fluid, withdrawn by aspiration at the time of the operation, was practically negative. A mass of débris, a few red blood cells and numerous cholesterin crystals were found. No pus cells were found at that time, but were probably overlooked in the hasty examination, as they can now be shown on the inner free surface of the section taken from walls of the gall-bladder. No cultures were made.

In an imperfect and somewhat hasty review of the recent literature of cholelithiasis, I have been unable to find the record of an exactly similar case.

Although gall-stones have been found in the bodies of new-born infants by Portal[1] and Lieutaud, their occurrence before the age of twenty is exceedingly uncommon. Their frequency in the dead subject varies within pretty wide limits in different sets of statistics. Thus, Peters, of Kiel, found them in 5 per cent. of all his autopsies, and Schroeder, of Strassburg, in 12 per cent. According to the tables of Schroeder, out of eighty-two sections made in persons under twenty years of age only two, or 2.4 per cent., were found to have gall-stones. The case reported here to-night is remarkable, in that a condition of cholelithiasis, with such advanced hypertrophic changes in the walls of the gall-bladder as usually accompany a case of long standing, should be found in a boy of nineteen. That no history could be obtained pointing to any previous biliary troubles only confirms the repeated observation of pathologists and good clinical observers, that the presence of gall-stones is frequently unaccompanied by any signs or symptoms during the life of the individual, which could give rise to a suspicion of their presence. This fact renders the diagnosis oftentimes exceedingly difficult. Normal bile is generally sterile. This was proven in 1884 by

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[1] Maladies du foie.

Netter,[1] experimentally on dogs, and later observers have confirmed his results. Gilbert and Girode[2] found it sterile within twenty-four hours after death in six out of eight cases. Naunyn[3] found it sterile in two cases one and five hours after death, and also in two punctures during life in cases of simple ectasia of the gall-bladder.

When the flow of bile from the cystic duct is completely obstructed, micro-organisms often enter the gall-bladder.

This, according to Naunyn, was first definitely shown by Charcot[4] and Gombault in 1876. They demonstrated the presence of micro-organisms in the bile after ligating the common duct in dogs.

In 1886 Netter[5] found that regularly in dogs, twenty-four hours after aseptic ligation of the common duct close to the duodenum, bacteria could be cultivated from the bile. He cultivated the staphylococcus, and also a short, straight bacillus, which was the bacillus coli communis. The bacillus coli communis, first described by Escherich[6] in 1885, is found normally in the intestinal canal, generally in connection with numerous other germs, and under certain conditions in other parts of the body.

Under ordinary circumstances it is not generally virulent, but given the proper soil and conditions it may rapidly change to an exceedingly virulent germ. So that at one time, as shown by Escherich, it may act as an ordinary pyogenic organism producing local abscesses; at another, as an active pathogenic germ producing fatal septic infection.

Acute cholecystitis, which is generally caused by infection through the bacillus coli communis under the favoring conditions provided by an obstruction of the cystic duct, generally leads to an empyema of the gall-bladder. In this condition we find changes in the walls of the bladder and changes in its fluid contents. The walls may be swollen, œdematous or even infiltrated with pus. The contents, instead of being normal bile, are a mixture of serum, pus and mucus, frequently without any appearance of bile coloring.

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[1] Progrès Médical, 1886.

[2] Comptes-rendus Soc. biol., 1890, No. 39.

[3] Klinik der Cholelithiasis, 1892.

[4] Archiv. de Phys. et Path., 1876, p. 453.

[5] Progrès Médical, 1886, p. 992.

[6] Fortschritte der Medicin, 1885.

Naunyn[1] made exploratory punctures in five cases of gall-stone colic in which the symptoms pointed to an acute cholecystitis, with the view of determining the character of the contents of the gall-bladder under these conditions. In no case did aspiration yield normal bile, and in only one was the fluid distinctly bile-colored, and in this case there was already a large proportion of albumen. The fluid from the other punctures was but lightly colored, contained some mucus, clear albumen and a few red and white blood cells.

In three cases out of five the fluid withdrawn showed the bacterium coli commune in great numbers. In one case it was sterile, in another no cultures were made. In all these cases, with one exception, the symptoms were generally mild, the fever absent or slight, chills single and not severe, or absent. The swelling of the gall-bladder, however, was considerable in each instance, and frequently, at the height of the attack, it could be felt as low as the umbilicus, and was at first very tender on pressure.

In one case the tenderness spread so rapidly over the whole right side of the abdomen, the muscles were so rigid, the respiratory movements of that side so restricted, and the collapse so pronounced, that on the first day after a careful examination a diagnosis of perityphlitis was made.

Courvoisier[2] speaks of an acute or peracute progressive empyema of the gall-bladder. The very few available cases, according to him, terminate fatally in a few days, death following from consecutive peritonitis. Potain,[3] in a clinical lecture at the Hospital Necker, reviews the difficulties in diagnosis with which cases of tumor in the region of gall-bladder are often surrounded, and mentions, in addition to the ordinary variety of empyema, a very grave condition, which is followed by rapid peritonitis. He alludes to a case which he saw in which death occurred on the second day after the onset of the attack of cholecystitis from a progressive peritonitis, and mentions, also, that in this case the walls of the gall-bladder were not perforated, but that infection had evidently spread from its cavity through the intact serosa, covering it to the general peritoneal cavity.

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[1] Op. citatim.

[2] Casuistisch-statistische Beiträge zur Path. und Chirurg. der Gallenwege, 1890.

[3] Jour. de Méd. et de Chirurg. Prat., November, 1882, p. 488..

Roswell Park, of Buffalo,[1] reports a case of suppurative cholecystitis in which the early symptoms, both local and general, pointed to an appendicitis, yet in which an operation showed an empyema of the gall-bladder.

The recent experiments by Barbacci,[2] of Florence, show pretty clearly the rôle played by the bacterium coli commune in peritonitis, due to perforation. It has also been shown that peritonitis, or at least peritoneal sepsis, may, and does, occur in cases of strangulated hernia from an infection by the same bacteria, and without perforation of the gut.

Bönnecken,[3] of Rostock, in 1890, demonstrated clearly the presence of these organisms in the fluid contents of the sac of a strangulated hernia. He experimented on dogs, producing artificial strangulation, and found in the collected fluid the bacterium coli commune in every case. This demonstrates clearly that these organisms, under certain conditions, can pass through the unbroken walls of an intestine and cause either general septic infection or occasionally a suppurative peritonitis.

The spread of infection through the unbroken walls of the gall-bladder can be readily explained in the light of these experiments.

I can find no description of gangrenous cholecystitis as a separate entity, and attribute the occurrence of gangrene in this case to the pressure of the enormous exudate within the walls of the gall-bladder and to a consequent stasis in the vessels. The very sudden onset may easily be explained by the lodgement of the large stone in the mouth of the cystic duct, and the subsequent intense inflammation probably by the rapid invasion of the cavity of the gall-bladder by micro-organisms from the adjoining gut.

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[1] ANNALS OF SURGERY, September, 1893.

[2] Centralblatt für Allgemeiner Phy. u. Path., October 12, 1892.

[3] Über Bakterien des Bruchsacwasser eingeklemmten Hernien und deren Beziehung zur peritoneal Sepsis, Virch. Archiv, Bd. CXX, 1890.

My chief regret is that no facilities were at hand at the time of operation for making cultures of the fluid in the gall-bladder and the pus in the peritoneal sac, and that the conclusions reached must be based on theory rather than on facts derived from a careful bacteriological examination.